

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

High-Resolution Imaging of Solar System Objects

PERFORMING ORGANIZATION

Earth and Space Sciences Division
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INVESTIGATOR'S NAME

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DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a. Strategy: The strategy of this investigation has been to develop new high-resolution imaging capabilities and to apply them to extended observing programs. These programs have included Io's neutral sodium cloud and comets. The Io observing program was carried out at Table Mountain Observatory (1976-81); providing a framework for interpreting Voyager measurements of the Io torus, and serving as an important reference for studying asymmetries and time variabilities in the Jovian magnetosphere. Comet observations made with the 3.6m Canada-France-Hawaii Telescope and 1.6m AMOS telescope (1984-87) provide the basis for studying early coma development in Halley, the kinematics of its nucleus, and the internal and external structure of the nucleus to the extent that it can be inferred from the dust and gas distributions in its vicinity. Images of GZ from the ICE encounter period form the basis for unique comparisons with in situ magnetic field and dust impact measurements to determine the ion tail and dust coma structure, respectively.

b. Accomplishments: New capabilities for solar system imaging observations were established at AMOS. Representative CFHT comet images remained on display at the National Academy of Sciences. The Io sodium cloud movie remained on display at the National Air and Space Museum. Processing, analysis, and publication of comet data continued. The collaborative sodium cloud modelling with W. H. Smyth of AER was concluded. An image based on the comparison of ICE magnetic field data with CFHT imaging data appeared on the cover of Comet Encounter, a book published by the AGU.

c. Anticipated Accomplishments: Conclusion of the analysis and archiving of the CFHT comet data set and the Table Mountain sodium cloud data set. Continuation of comet observations at AMOS and initiation of new observing programs which will emphasize initially the study of Martian dust storm development.

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d. Publications:

Goldberg, B. A. et al. 1988, cover photograph and supporting explanation for Comet Encounter, A. J. Dessler, Editor, American Geophysical Union.

Goldberg, B. A. et al. 1986, "High-Resolution Imaging Studies of the Near-Nucleus Regions of Comets", Proc. 20th ESLAB Symposium on the Exploration of Halley's Comet, Heidelberg, 27-31 October, ESA SP-250 (December 1986), pp. 153-156.

Slavin, J. A., Goldberg, B. A. et al. 1986, "The Structure of a Cometary Type I Tail: Ground-Based and ICE Observations of p/Giacobini-Zinner", Geophys. Res. Lett. 13, No. 11, pp. 1085-1088.

Slavin, J. A., Goldberg, B. A. et al. 1986, "The P/Giacobini-Zinner Magnetotail", Proc. 20th ESLAB Symposium on the Exploration of Halley's Comet 27-31 October, ESA SP-250 (December 1986), pp. 81-87.